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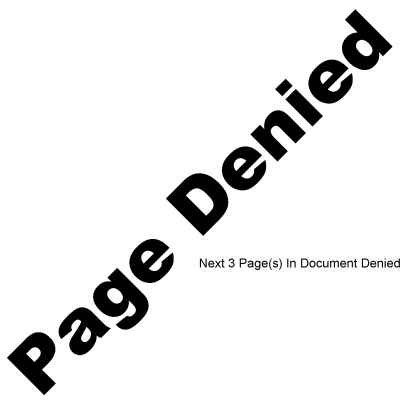

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SEA WATER COOLING PIPELINE OF DIESEL ENGINE AND DIESEL-COMPRESSOR SNORT EXHAUST SYSTEM, HEAT EXCHANGERS AND SHAFTINGS

Description and Operating Instructions

H641-A76-244

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I. DESCRIPTION

A. PURPOSE AND BASIC SPECIFICATIONS

The sea water cooling pipeline is intended for feeding sea water required for cooling the main diesel engine and diesel-compressor ДК-2 snort exhaust system, diesel engine oil and fresh water coolers, air coolers and bearings of propulsion motors, thrust bearings of shaftings and stuffing boxes, oil coolers of hydraulic system.

Besides, the cooling pipeline is used for some auxiliary purposes and therefore it is furnished with branches for connecting to:

- the pipeline of the drain mains (see the respective Description and Instructions for "Shipboard Drain System");
- the cooling pipeline of electric compressor ЭК-10 (see the respective Description and Instructions for "Electric Compressor ЭК-10 Water Cooling Pipeline");
- the shipboard fuel compensation pipeline (see the respective Description and Instructions for "Shipboard Fuel System");
- the pipeline of the gravity flush-type W.C. (see the respective Description and Instructions for "W.C. Arrangement");
- the sanitary pipeline (see the respective Description and Instructions for "Fresh, Washing and Sanitary Water Pipeline");
- the distilling plant pipeline (see the respective Description and Instructions for "Distilling Plant");
- the diesel engine fresh water cooling pipeline (see the respective Description and Instructions for "Diesel Engine Fresh Water Cooling Pipeline").

The cooling pipeline is composed of copper-nickel pipes with bores 6, 10, 15, 25, 32, 40, 50, 60, 80, 100, 125, 150 and of copper pipes with bores 6 and 3. The hull valves and flanges are made of brass. The line valves and unions are made of bronze. The pipes with bore up to 32 are connected by means of unions while the pipes with bore exceeding 32 are connected by means of flanges.

Note: Within the superstructure all the pipes irrespective of their bore are connected to the parts of the snort exhaust system by means of flanges.

Packing gaskets are made of paronite. Service life of durite joints is 5 years.

The assembled cooling pipeline of the snort exhaust system running in the superstructure is tested in operation at the diesel engines being operated.

Hydraulic pressure of 3.0 kgf/cm^2 was used for testing the cooling pipeline of diesel-compressors ДК2 between valves 30, 3 54, 55 and valves 29, 57 and for testing the cooling pipeline o the oil coolers and the snort exhaust pipe within the pressure hull between valves 12, 19, 69 and valves 25, 61, 66.

Hydraulic pressure of 38 kgf/cm^2 was used for testing the remaining sections of the cooling pipeline.

The heat exchangers and the snort exhaust pipes of diesel engines and diesel-compressors ДК-2 are cooled with the help of pumps mounted on diesel engines and diesel-compressors ДК-2; th diesel-compressors may be also cooled by means of pumps ВШН-90a

Sea water is fed to the pipeline for cooling the shaftings by means of two centrifugal electrical pumps ВШН-90a located on the bulkhead of frame 79.

B. GENERAL DESCRIPTION AND DESCRIPTION OF INDIVIDUAL UNITS

The sea water cooling pipeline of the snort exhaust system of diesel engines, diesel-compressors, heat exchangers and the shaftings includes the following:

- two pumps, type ВШН-90a;
- two sea water filters;
- fittings and pipes;
- control instruments and signalling system.

Sea water pumps are mounted on the main diesel engines. The intake cavities of these pumps connected to kingston valves 17, 73 mounted on the pressure hull by means of pipes and through durite joints, valves 14, 19, 11, 12, 76, 69, 75, 16 and the fil ters.

Kingston valves 17 and 73 are interconnected by means of pipe "a" through filters and valves 16 and 75. Due to such connection water may be taken by each pump from any kingston valve.

Pipe "a" has branches running to:

- the main drain line;
- the diesel compressors ДК-2 cooling pipeline;
- the intake cavities of centrifugal pumps for cooling the shaftings.

Water from the pump mounted on the diesel engine through the pipes, air cooler of diesel engine and durite joints flows to the oil coolers, fresh water coolers and then along pipes "b" into the cooling cavities of intermediate pipe bends and bodies of inner flaps of the snort exhaust system.

Pipes "b" have branches for feeding water through flexible connections to the cooling cavities of the compensators, coamings, the covers and supports of the flaps of the snort exhaust system, from where water gets into pipes "c".

Water is drained from the flap bodies along pipes "c" through non-return shut-off valves 25, 61, 66 and drain kingston valves 22, 64, 70 and then flows through pipes "d" into the cooling cavities of outer pipe bends of the snort exhaust system.

Pipes "c" have branches for connecting the sanitary pipeline. Mounted on the pipes in front of kingston valves 22, 64 and 70 are valves 24, 62, 68 connected to the starting air pipeline and intended for scavenging the cooling pipeline.

Safety valves 20, 21, 67 installed on the pipes of intake cavities of sea water pumps mounted on the diesel engines are intended for protection of oil and fresh water coolers against possible damage caused by leakages in valves at diving.

The branches with hose joints are intended for washing the sea water cavities of respective heat exchangers.

Water flows from pipes "d" through drain kingston valves 22, 64 and 70 into the cooling cavities of outer pipe bends of the snort exhaust system.

From the cooling cavities of outer pipe bends of the snort exhaust system water flows through pipes "e" and their branches into the cooling cavities of the outer flap bodies and their coamings, into the outer pipe bends of the snort exhaust system and then it is discharged overboard.

From the baths of outer flaps water is drained through pipes "f".

For the cooling of all the outer flaps during operation of one of the diesel engines, the cooling pipes are jointed by means of pipes "g".

Pipes "d" feeding water to the outer pipe bends of the snort exhaust system are furnished with branches for connecting the W.C. pipeline.

Proper distribution of cooling water is obtained with the help of throttling washers mounted on the pipes feeding water t the outer pipe bends and the outer flaps of the snort exhaust system.

From the outer pipe bends of the wing diesel engine snort exhaust system water flows through pipes "i" and is fed for coo ing the pipe section of the snort exhaust system; from this sec tion water is discharged overboard.

The intake cavities of pumps ВШН-90а are connected through rubber-welded branch pipes and valves 10, 79 with pipe "a" which interconnects kingston valves 17 and 73 through valves 16 and 7 and the filters. As a result, when one of the kingston valves i out of order the operation may be carried out through the other kingston valve. The delivery cavities of the pumps are connecte with two-valve box 82 by means of the pipes with welded pieces for valves 1 and 78 and by means of pipes "j" through rubber-welded branch pipes. As a result, when one of the pumps is out of order, the other pump may be used for cooling.

From two-valve box 82 water is fed through pipes "k" for cooling the shaftings.

Pipe "k" has branches for connecting:

- fresh water cooler ОПВ-1.2;
- the shipboard fuel compensation pipeline;
- the wing diesel engine snort exhaust system cooling pipeline;
- main drain line;
- diesel-compressor ДК-2 cooling pipeline;
- air conditioning pipeline.

Pipe "j" of portside pump ВШН-90а has a branch from which water is fed to shafting cooling pipe "k" through valve 80, fre water cooler and valve 81. The fresh water cooler serves for co ing the diesel engines after their stopping.

When the submarine is cruising at surface, the ship fuel is compensated with sea water through valves 77 and 71 (see the respective Description and Instructions for Shipboard Fuel System).

Water required for cooling diesel-compressors ДК-2 is fed by means of the pumps mounted on the diesel-compressors. Water used for cooling the diesel-compressors is fed from the branch of pipe "a" through valve 34, valves 30 and 54 and the flexible connections to the pumps of the diesel-compressors. From the diesel-compressor pumps, cooling water is supplied to the silencing branch pipe cooling cavities and then to the diesel-compressors. From the diesel-compressors cooling water flows through the pipelines with durite joints, sight glasses to behind-jacket spaces of snort exhaust system of the diesel-compressors and then is discharged overboard through non-return shut-off valves 29, 57, valve 32 and kingston valve 31.

Mounted on the pipe between valve 32 and kingston valve 31 is a branch to connect the diesel engine fresh water cooling pipeline.

The sight glasses are used to check presence of water in the cooling line of diesel-compressors ДК-2.

In case of failure of pumps mounted on diesel-compressors ДК-2, cooling water may be fed by means of pumps ВЦН-90а along pipe "k" through valves 53, 55 and 33. When the diesel engines do not operate, cooling water is fed to the snort exhaust system along pipe "k" through valves 59, 60 and 27.

From two-valve box 82 water is fed through pipe "k" to compartments VI and VII for cooling the shaftings.

Pipe "k" and its branches are used to feed water:

- through three-valve box 35 for cooling the bearings of the propulsion motors;
- through four-valve box 52 for cooling the air coolers;
- through three-valve box 50 for cooling the thrust bearings of the shafting;
- through valve 37 for cooling the oil cooler of the shafting.
- through pipe "l" to the bearings of the economic speed electric motor;

Note: When starting economic speed electric motor with the air conditioning system being operated, water required for cooling the bearings of the electric motor is fed by pump MUB-40/15 of the conditioning system. In this case water is drained overboard through valves 41 and 42 and the deadwood stuffing box.

- through valves 38, 39, 41, 42, 44 and 45 for pumping the deadwood stuffing boxes; from these boxes water is drained overboard;

- through valve 40 water is fed to the oil cooler of the hydraulic system.

The main pipeline of compartment VI has branches for connecting:

- the pipeline of the distilling plant;
- the cooling pipeline of electrical compressor SK-10.

Cooling water is drained overboard through the drain pipe, valve 48 and drain kingston valve 49.

The drain pipe receives water flowing from:

- the bearings of the propulsion motors through three-valve box 51;
- the air coolers through four-valve box 36;
- the thrust bearings of the shafting through three-valve box 47;
- the oil cooler of the shafting through valve 46;
- the oil cooler of the hydraulic system through valve 43.

The cooling pipeline is connected to the main drain pipeline. In the case of failure and the flooding of the hold, pumps BUH-90a are added to the hold pumps. These pumps suck water from the main drain pipeline through valves 13, pipe "a", valves 10 and 79 and rubber-welded branch pipes and pump it overboard through the shafting cooling pipelines and draining kingston valve 49.

Mounted on angular valves 16, 75 and 13 are valves 96 (see Appendix 5) connecting under-valve and over-valve cavities of valves 16, 75 and 13.

To facilitate the opening of valves 16, 75 and 13 when the submarine is submerged at a depth exceeding 150 m, open valve 96

(see Appendix 5), equalize pressure thus considerably decreasing an effort required for opening valves 16, 75 and 13.

Valves 1 and 78 are used for ventilating pressure cavities of pumps BNH-90a.

Valves 18 and 74 are intended for ventilating filters.

Valve 28 is intended for filling the cooling pipe line of diesel engines with fresh water in case of failure.

Characteristics of Individual Units

Electrical Pump BNH-90a

1. Type of the pump -vertical, centrifugal, single-stage, directly driven by electric motor.
2. Capacity - 90 m^3/hr.
3. Total pressure - 30 m H_2O.
4. Suction vacuumetric lift - 5 m H_2O.
5. Suction pressure - up to 35 kgf/cm^2.
6. Power on pump shaft - not more than 14 kW.
7. Speed - 2700 r.p.m.

The given data are specified for the rated power of 220 V mains.

C. CONTROL INSTRUMENTS AND SIGNALLING SYSTEM

Nos in diagram	Purpose and type of instrument	Type of indicating instrument and scale	Normal operating pressure / Maximum operating pressure, red line	Place of installation of indicating instrument	Note
1	2	3	4	5	6
3, 83	Measurement of water pressure in delivering lines of pumps BЦН-90a. Pressure gauge	MTK-100E x x60/40, 2.5 accuracy grade	3.0-32.0/32.0	Trunk for feeding air to starboard diesel engines	
2, 84	Measurement of water pressure in suction lines of pumps BЦН-90a. Pressure gauge	MTK-1000E x x 60/40, 2.5 accuracy grade	0-27.0/28.0	Same	
56, 58	Measurement of water pressure in delivering lines of pumps ДК-2. Pressure gauge	MTK-100E 4.0/2.7, 2.5 accuracy grade	1.5/1.6	Near diesel-compressor	

1	2	3	4	5	6
5, 4, 85	Measurement of water pressure in delivering lines of pumps mounted on diesel engines.Pressure gauge	MTK-100B-100, 2.5 accuracy grade	3.5/4	On instrument boards of diesel engines near recess of conning station on bulkhead of frame 82	
6, 7, 8	Measurement of pressure in water cavities of snort exhaust system. Pressure gauge.	MTK-100B x x 10/6, 2.5 accuracy grade	1.5-3.0/3.5	In recess of conning station on frame 82	

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Valves 14, 11 and 75 used for feeding water to the diesel engines are furnished with remote control hydraulic drive. Valves 14, 11 and 76 are controlled from the control and signalling station 93 (see Appendix 2). Each diesel engine has its own control station. The station is equipped with a key, type [illegible]B, two signal lamps and a lamp check button. To open the valves, set the key to the "open" position. The valves are closed by setting the key to the "closed" position. After the commands have been fulfilled, the handles of keys should be set to the middle position.

Sea water is fed through the pipes, valves 15, 9 and 72 to the sensors of pressure relays PMK-57 (87) whose contacts are connected in parallel with the contacts of the keys of valves 14, 11 and 76. Valves 14, 11 and 76 are automatically closed when pressure in the pipeline reaches 4 kgf/cm^2 (after operation of the pressure relay). After closing of the valve, the electric magnets of control valves 91 are dienergized with the help of relay PMG whose contacts open the power supply circuit.

For the repair and maintenance of the valve manipulators, the voltage is disconnected from the electric magnets by means of switch [illegible]-10 69 connected to the electromagnet circuit. Open and closed positions of the valve are indicated by respective signal lamps on control and signalling station 93. The lamps are checked with the help of a check button depressing of which is resulted in the lighting of all the lamps. The control station is fed with D.C. 175-320 V from the distribution boxes and the ship's mains through automatic circuit switch 95 (T.CMB.9001-25A) and distribution box (4232-14) 94.

The signalling system is supplied with alternating current, 24 V, 50 c.p.s., fed from the distribution box of the ship's mains.

The circuits are connected by means of cables with cross-sections of 1x1 mm^2, 7x1 mm^2, 2x1.5 mm^2, 5x1.5 mm^2, 10x1.5 mm^2.

The control and signalling system of the valves includes the following equipment:

- pressure relay PMK-57 - 3 pcs;
- light signal contactor ЗСС - 3 pcs;
- junction box СК-32 - 1 pc;

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- switch T. $\frac{\text{ПНМ2-10}}{\text{Н2}}$ - 3 pcs;
- control and signal board - 3 pcs;
- junction box СЯ-10 - 1 pc;
- switch T-5M - 1 pc;
- distribution box A232-14 - 1 pc;
- automatic circuit switch T.СМ3.9001-23А3 - 1 pc.

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II. MAINTENANCE INSTRUCTIONS

A. GENERAL CARE AND MAINTENANCE

Caution! When safety valves 20, 21 and 67 or relays sanding a pulse for closing valves 14, 11 and 76 operate, the water feeding should be immediately interrupted by closing valves 19, 18, 68, non-return shut-off valves 25, 66, 61 and drain kingston valves 22, 64 and 70. In the case when valves 14, 11 and 76 fail to close automatically, close them manually with the help of a ratchet wrench.

1. Check always the flange joints and pipe unions for airtightness. In case of leakage, tighten up the joints or replace the gaskets.

2. The sea water filters should be always clean. Inspect the filters at stands and clean them periodically.

3. Inspect the protectors installed in the filter covers (one protector in each cover) and replace them, if necessary.

Pin-type protectors should be inspected and replaced at least once in three months. During inspection, the protector surface should be cleaned of dirt and corrosion. In case of wear exceeding 50 per cent, the protectors should be replaced.

At least once a quarter inspect all the upper protectors of air coolers of the propulsion motors. The lower protectors located on the side which is opposite to the fastening of the air coolers should be inspected once a month. During repairs associated with the dismantling of the air coolers, replace the lower protectors located on the side of fastening of the air coolers.

Note: For the access to the protectors of the air coolers of electric motors ПГ-101 and ПГ-102 near frames 101-103 required for the inspection and the replacement of the protectors, remove lower parts of casings of pneumatic clutches and detachable plating in the hold.

4. Periodically, at least once a day, blow through the engine room kingston valve support.

5. Watch the readings of the pressure gauges. Once a year check the pressure gauges for proper operation and replace them, if necessary.

B. PREPARING FOR OPERATION

Initial Position

6. In the initial position all the valves and kingston valves, except for valves 15, 9, 72, 26, 23 and 65 should be closed. Valves 15, 9, 72, 26, 23 and 65 are always open and should be closed only when repairing the pressure relay (valves 15, 9 and 72) and washing the coolers (valves 26, 23 and 65).

7. Safety valves 21, 20 and 67 are adjusted for a pressure of 5 kgf/cm^2 and sealed. The pressure relays sending pulses for closing valves 14, 11 and 76 are adjusted for a pressure of 4 kgf/cm^2 and sealed.

C. STARTING, MAINTENANCE IN OPERATION AND DISENGAGEMENT

Starting the Main Diesel Engines

8. Open engine room kingston valves 17 and 73.

9. Open valves 16 and 75.

10. Open valve 10 or 79 of one of pumps RUH-90a, which is prepared for starting, and the respective valve of two-valve box 82.

11. Open valves 14, 11, 76, 19, 12 and 69, non-return shut-off valves 25, 66, 61 and drain kingston valves 22, 64, 70.

Notes: 1. When starting one or two diesel engines, only the valves of respective diesel engine should be opened.
2. Using keys on the automatic remote control station or the control valves, open valves 14, 11 and 76. Make sure that handles of control valves 91 are in the middle position. In case of emergency open valves 14, 11 and 76 with the help of a ratchet wrench set on a square of the valve shaft.

12. Open the valves on four-valve boxes 52 and 36, on three-valve boxes 35, 50, 51 and 47, valves 37, 45, 44, 38, 39, 42, 41, 48 and 46 and drain kingston valve 49.

13. Start pump RUH-90a whose valves of the pipeline are open.

Prior to starting, open valve 1 or 78 and 18 or 74 for ventilating the pressure cavity of the pump and the filter, respectively, and then close these valves.

14. After stopping the diesel engines, stop electric pump BUH-90a and set all the valves to the initial position.

Notes: 1. Close valves 14, 11 and 76 with the help of keys of the remote control station or control valves. Make sure that handles of control valves 91 are in the middle position. In case of emergency close valves 14,11 and 76 with the help of a ratchet wrench set on a square of the valve shaft.
2. If the diesel engines are stopped for not more than 1 hour, engine room kingston valves 17 and 73 and valves 19, 12 and 69 may be left open.

15. In case of failure of one of the centrifugal electric pumps BUH-90a, the cooling may be effected by means of a sound pump; in this case it is necessary to close valve 10 or 79 of the failed pump and a respective valve on two-valve box 82.

Preparing for Operation in Submerged Conditions

Caution! Prior to diving, make sure that valves 14, 11, 76, 19, 12, 69, 25, 66, 61, 24, 62, 34, 30, 54, 68, 53, 32, 59, 60 and 27 and drain kingston valves 22, 64, 70 and 31 are closed.

16. Open engine room valves 17 and 73.

17. Open valves 16 and 75.

18. Open valve 10 or 79 of one of pumps BUH-90a which is prepared for starting.

19. Open valves on four-valve boxes 52, 36 and on three-valve boxes 35, 50, 51, 47, valves 37, 45, 44, 38, 39, 42, 41, 48, 46 and drain kingston valve 49.

20. Start pump BUH-90a whose valves of the pipeline are open.

Note: Prior to opening valves 16 and 75 at a depth of 150 m, open by-pass valve 96 (see Appendix 5).

21. After stopping the propulsion motors, stop pump BUH-90a and set all the valves to the initial position.

22. For cooling the propulsion motor of economic speed with sea water of the air conditioning system (pumps BUH-90a do not operate), open valves 41 and 42 (see the respective Instructions for "Air Conditioning Sea and Cold Water System").

23. After the propulsion motor of the economic speed has been stopped, close valves 41 and 42.

Procedures for Starting the Diesel-Compressor

24. Open engine room kingston valve 17 or 73 of one of the wing engines.

25. Open valves 16, 75, 10 or 79, 34, 30, 54, 32, 59, 60, 27, the valve of two-valve box 82 and non-return shut-off valves 25, 61, 29, 57 of the respective wing engine.

26. Open drain kingston valve 22 or 64 of the corresponding wing engine and drain kingston valve 31.

27. Start pump BUH-90a whose valves of the pipeline are prepared for the pump starting (prepared for cooling the snort exhaust system).

28. After the diesel-compressors have been stopped, stop the electric pump and set all the valves to the initial position.

Note: If the respective wing diesel engine operates, prior to starting the diesel-compressor, open only valves 32, 34, 30 or 54, non-return shut-off valve 57 or 29 and drain kingston valve 31.

Feeding the Diesel-Compressors with Water by Pumps BUH-90a

(failure of cooling pumps on the diesel-compressors)

29. Open engine room kingston valve 17 or 73 of one of the sides.

30. Open valves 16, 75, 10 or 79, 32, 53, 33, 55, 59, 60, 27, the valve of two-valve box 82 and non-return shut-off valves 25, 61, 57 and 29 of the respective side.

31. Open drain kingston valve 64, 22 of the corresponding side and drain kingston valve 31.

32. Start pump BUH-90a whose valves of the pipeline are prepared for the starting.

33. After diesel-compressor DK-2 has been stopped, stop pumps BUH-90a and set all the valves to the initial position.

Note: If the respective wing diesel engine operates, prior to starting the diesel-compressor, it is necessary to

open only valves 32, 53, 33, or 55, non-return shut-off valve 57 or 29 and drain kingston valve 31.

Feeding of Water to Diesel Engine Fresh Water Cooler After Stopping the Diesel Engines

34. Open engine room kingston valves 17 and 73.

35. Open valves 16 and 75.

36. Open valve 79 of port side pump BUH-90a.

37. Open valves on four-valve boxes 52, 36, three-valve boxes 35, 50, 51, 47, valves 37, 45, 44, 38, 39, 42, 41, 48, 46 and drain kingston valve 49.

38. Open valves 80, 81.

39. Start port side pump BUH-90a.

40. After cooling the diesel engines, stop pump BUH-90a and set all the valves to the initial position.

Feeding of Water to Oil Cooler of Hydraulic System

41. Open valves 40 and 43.

42. After the water feeding has been completed, close valves 40 and 43.

Emergency Drainage of Compartments by Pumps BUH-90a

The present Instructions deal only with the operations on intake of water from the pipelines of the shipboard drain system and discharge of water to overboard with the help of centrifugal electric pumps BUH-90a.

Drainage of Compartments

43. Open valves 10, 79, 13 and valves on two-valve box 82.

44. Open the respective valves on the main drain pipeline.

45. Open the valves on four-valve boxes 52 and 36, valve 48 and drain kingston valve 49 in compartment VI.

46. Start electric pumps BUH-90a.

After stopping the pumps, do the following:

47. Set all the valves to the initial position.

Note: Compartments may be drained by means of pumps RMH-90a at a depth not exceeding 25 m.

D. MAINTENANCE DURING PROTRACTED PERIOD OF STANDSTILL

When the diesel engine is stopped for a long period, drain water from the system by opening the drain plugs on the coolers and by blowing air through valves 24, 62, 68. During blowing air through the pipeline running within the pressure hull, non-return controlled valves 25, 61 and 66 should be fully opened.

Assembly and Disassembly

During assembly and disassembly of the pipeline, see that foreign objects do not get into the pipeline. For this purpose close the ends of the disconnected pipelines with wooden or metal plugs. Never close the pipes with cloth or tow to prevent them from getting inside the pipeline.

Never use non-standard tools for the assembly and disassembly of pipelines to preclude damage of parts.

After each repair of the pipeline or its separate sections, check the pipeline for proper operation and test it for air-tightness.

E. TROUBLES AND REMEDIES

Nos	Trouble	Possible cause	Remedy on board the ship
1	Excessive vacuum on suction side of pump RMH-90a	Clogged grate of engine room kingston valve	Blow through engine room kingston valve
		Clogged sea water filter	Clean filter gauze

Nos	Trouble	Possible cause	Remedy on board the ship
2	Signal lamp of pressure gauge relay lights at diving	Valves 11, 76, 1.. drain kingsto.. valves 22, 64, 7.. or second valves 25, 61, 66 and not air tight	Close valves 69, 12 and 19: if signal lamp continues to light, stop diving. At any suitable time lap plates of faulty valves
3	Water leakage from flanges or pipe unions	Loose joints	Tighten up joints
		Damaged gasket	Replace faulty gasket
4	Water leakage from durite joints	Loose clamping collars	Tighten up clamping collars
		Faulty durite joint	Replace faulty durite joint
5	Pump RUH-90a fails to feed water	Air penetrates into suction line of pump	Open valves 1, 78, 18 and 74 and remove air from the system
		Faulty pump	Feed water by means of sound pump

F. SCHEDULED INSPECTIONS AND REPAIRS

Daily Inspections

1. Inspect and clean the pipelines, valves and control instruments.

2. Make sure that the safety valves and pressure gauges are sealed.

3. In case of leaks, tighten up the flange and pipe union joints.

Weekly Inspections

Perform all the operations specified for the daily inspections and besides:

4. Clean and lubricate the valve threads, re-assemble and work the tight valves.

5. Turn all the valves. Make sure that the valves are set to correct positions and inspect the pipelines for proper connection.

Monthly Inspections

Perform all the operations specified for the weekly inspections and besides:

6. Inspect stuffing box packings of valve stems, tighten or pack them, if necessary.

7. Open, clean and wash the sea water filters.

8. Inspect the condition and fastenings of the rubber metal welded pipe branches, flange joints of pipelines and drain plugs.

Inspections during Scheduled Repairs of Ship

Perform all the operations specified for the monthly inspections and besides:

9. Proceeding from the state of valves and kingston valves, reassemble and lap them and after re-assembly adjust the safety valves.

Pressure Tests

After repair or disassembly of the pipeline, test the latter for airtightness in the following way:

10. The cooling pipeline of the snort exhaust system running in the superstructure should be tested by pressure with the diesel engines being operated.

11. The cooling pipeline of diesel-compressors ДК-2 running from valves 30, 33, 54, 55 to valves 29, 57 should be tested at a hydraulic pressure of 3.0 kgf/cm^2.

12. The cooling pipeline of the air and oil coolers and the snort exhaust system running inside the pressure hull from valves 12, 19, 69 to valves 25, 61, 66 should be tested at a hydraulic pressure of 3.0 kgf/cm^2.

13. The remaining cooling pipeline is tested at a hydraulic pressure of 38 kgf/cm^2.

Reference Data

When operating the sea water cooling pipeline, follow the present Instructions and the respective Descriptions and Instructions for the following articles:

1. Diesel-compressor ДК-2.
2. Diesel engines 2Д42.
3. Shipboard drain system.
4. Shipboard fuel system.
5. W.C. Arrangement.
6. Fresh, washing and sanitary water pipeline.
7. Diesel-engine fresh water cooling pipeline.
8. Starting air pipeline of main diesel-engines, diesel-compressors ДК-2 and pneumatic clutch control pipeline.
9. Electric compressor ЭК-10 water cooling pipelines.
10. Cold and sea water air conditioning system.
11. Automatic remote control system of diesel-engines 2Д42.

C O N T E N T S

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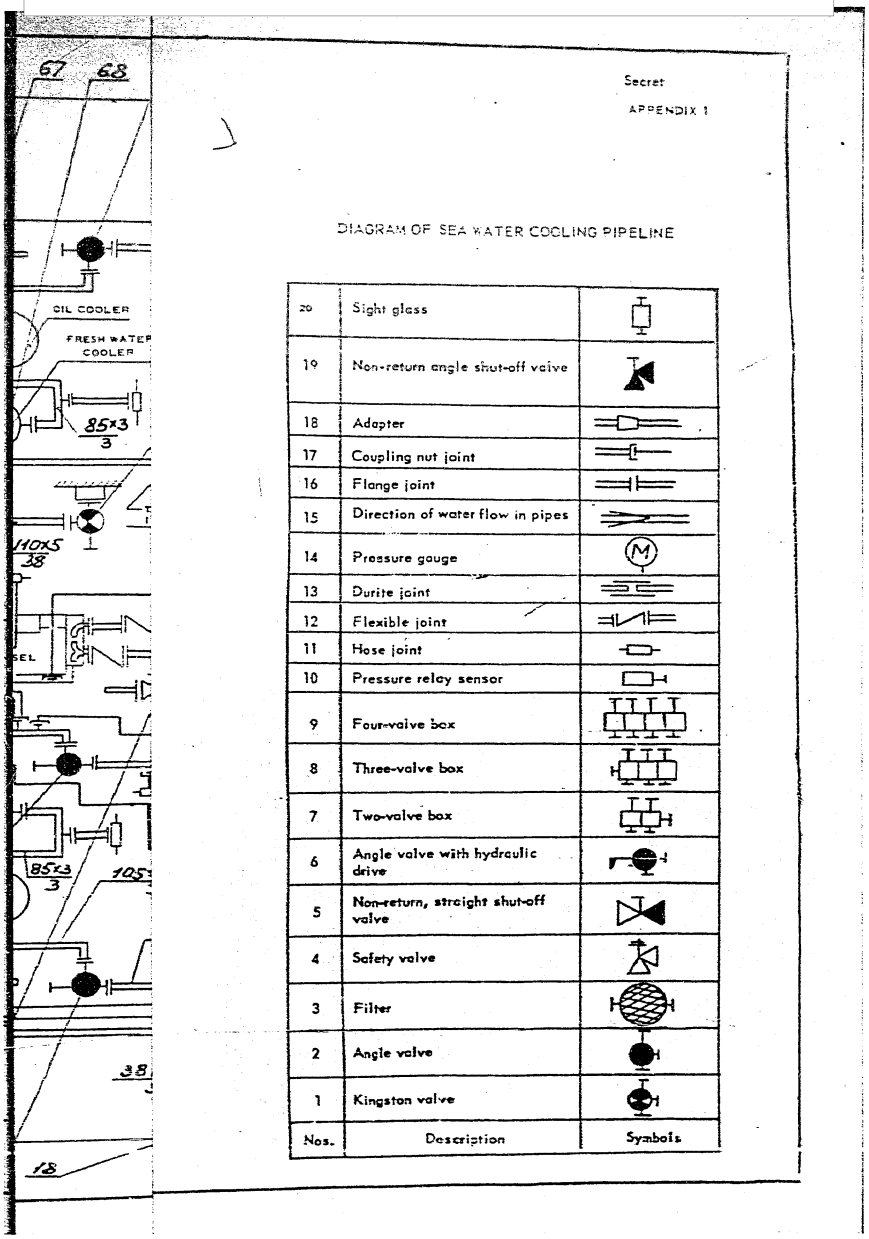

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APPENDIX 1

DIAGRAM OF SEA WATER COOLING PIPELINE

Nos.	Description	Symbols
20	Sight glass	
19	Non-return angle shut-off valve	
18	Adapter	
17	Coupling nut joint	
16	Flange joint	
15	Direction of water flow in pipes	
14	Pressure gauge	
13	Durite joint	
12	Flexible joint	
11	Hose joint	
10	Pressure relay sensor	
9	Four-valve box	
8	Three-valve box	
7	Two-valve box	
6	Angle valve with hydraulic drive	
5	Non-return, straight shut-off valve	
4	Safety valve	
3	Filter	
2	Angle valve	
1	Kingston valve	

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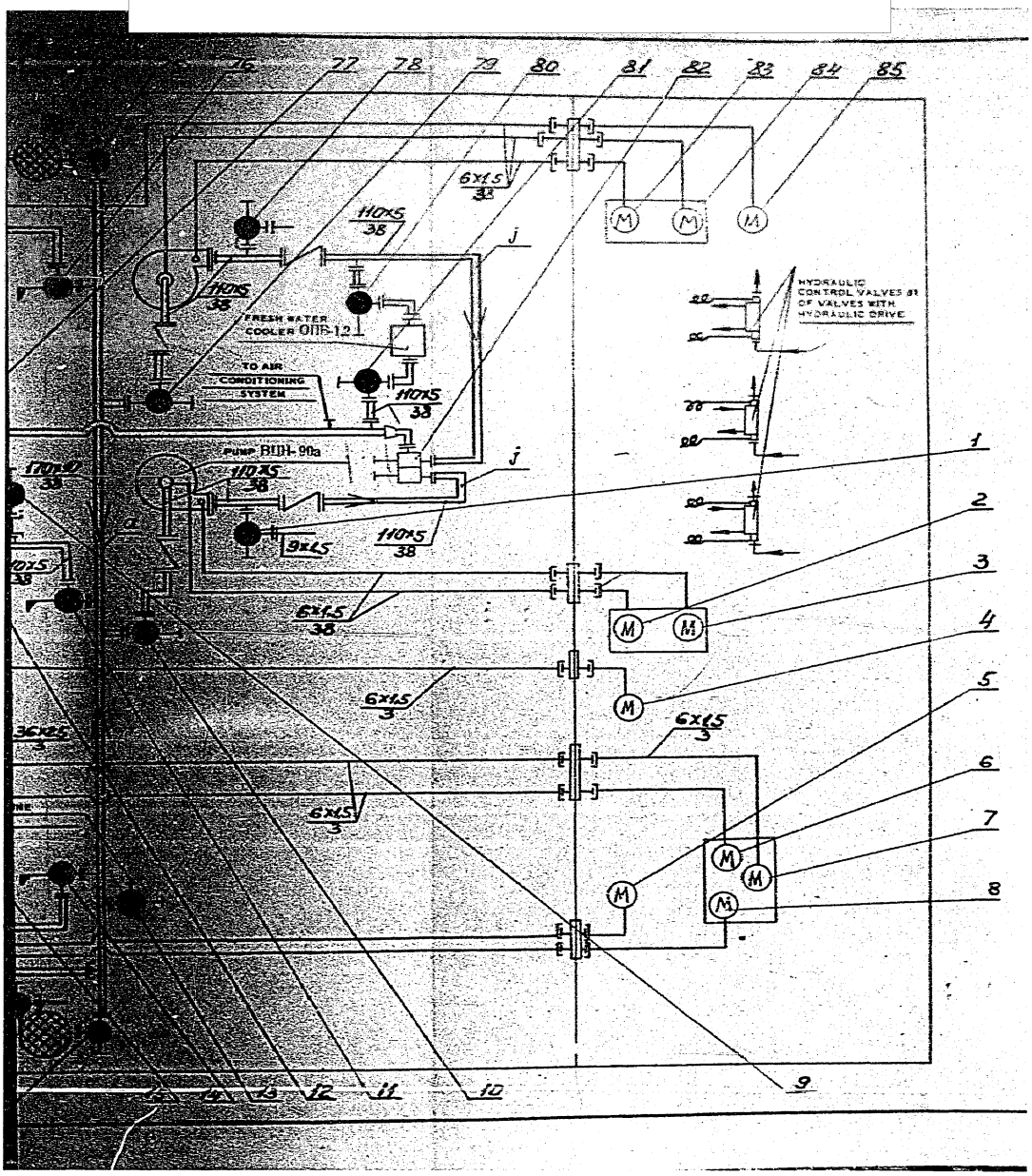

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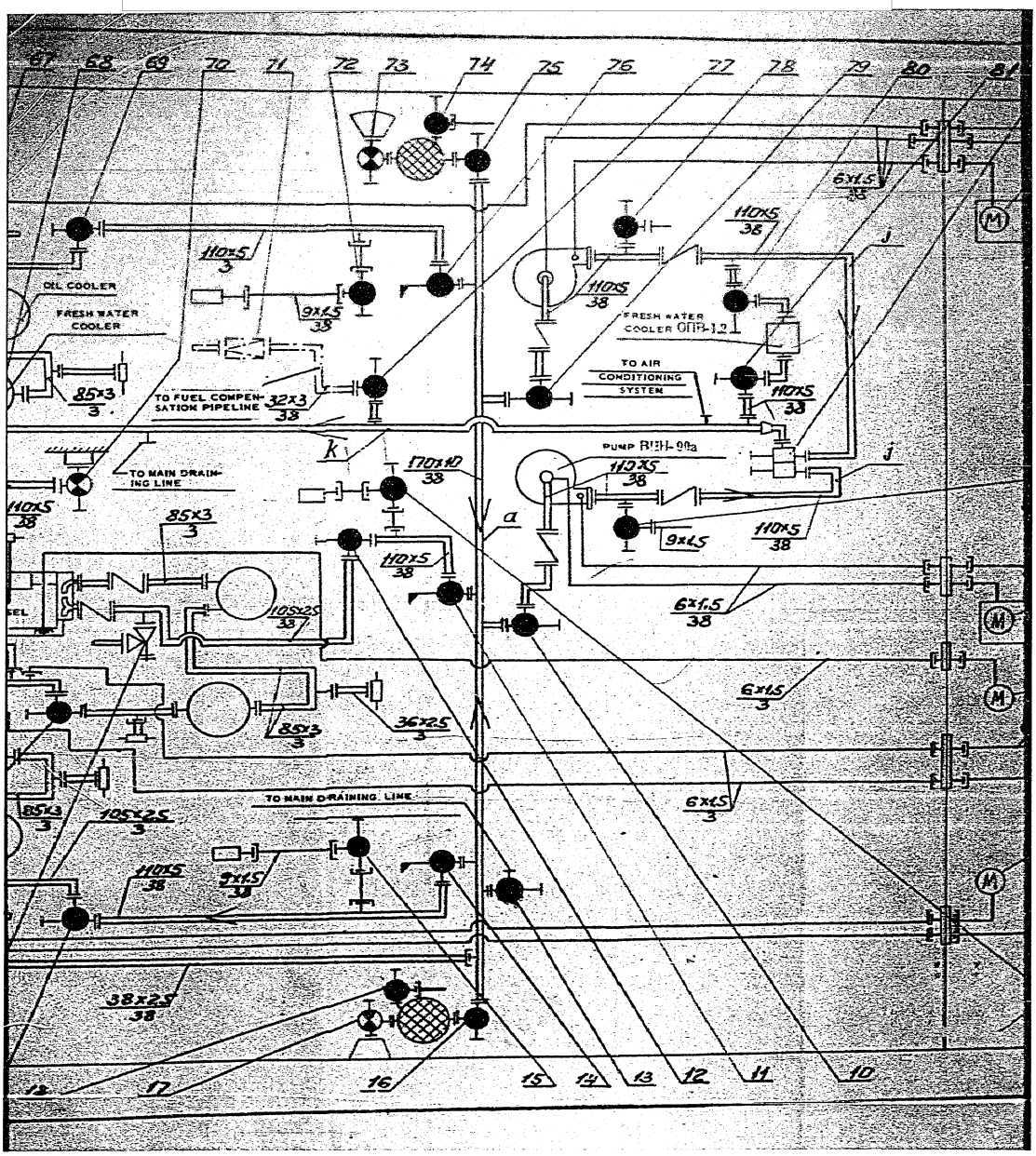

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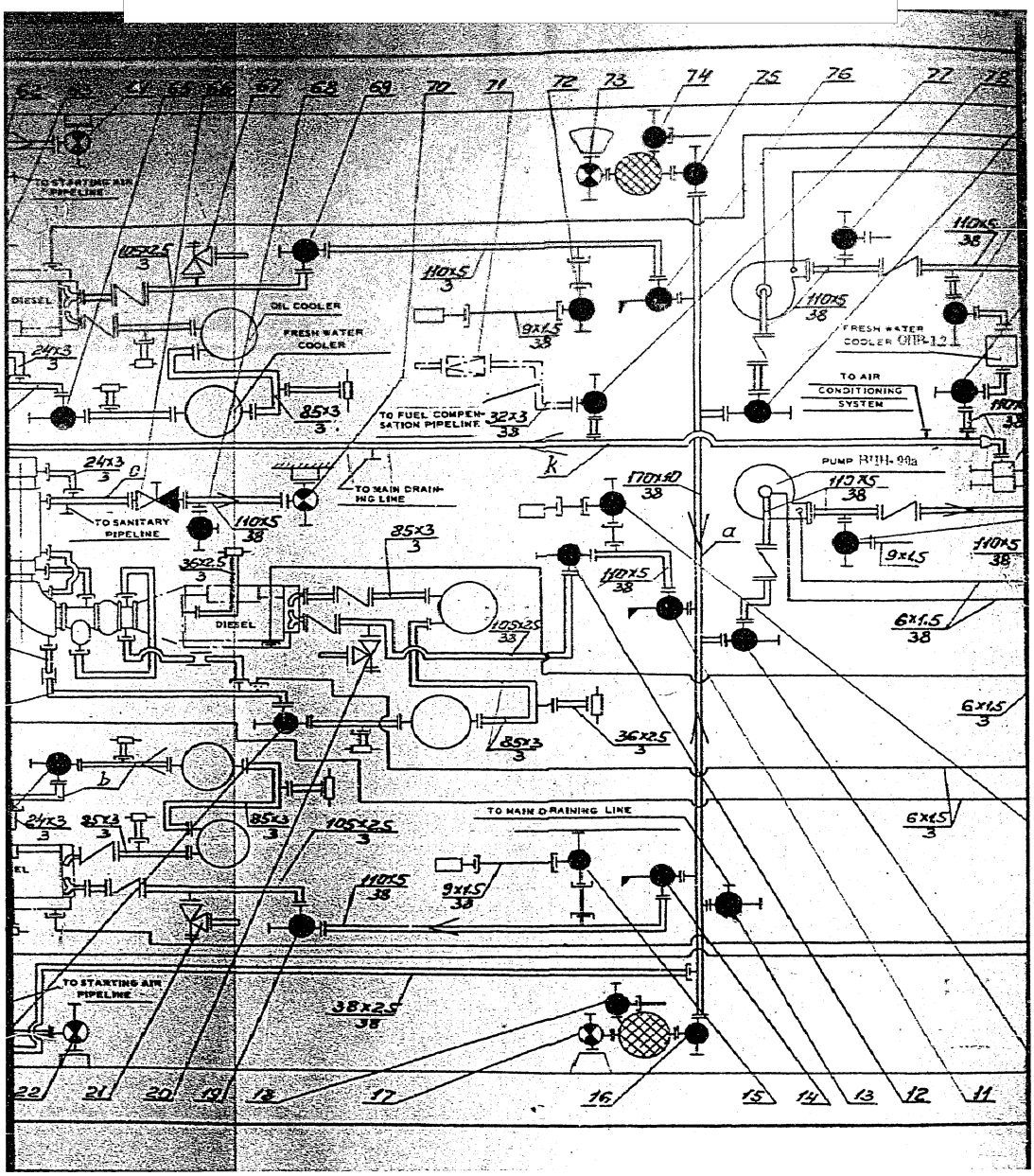

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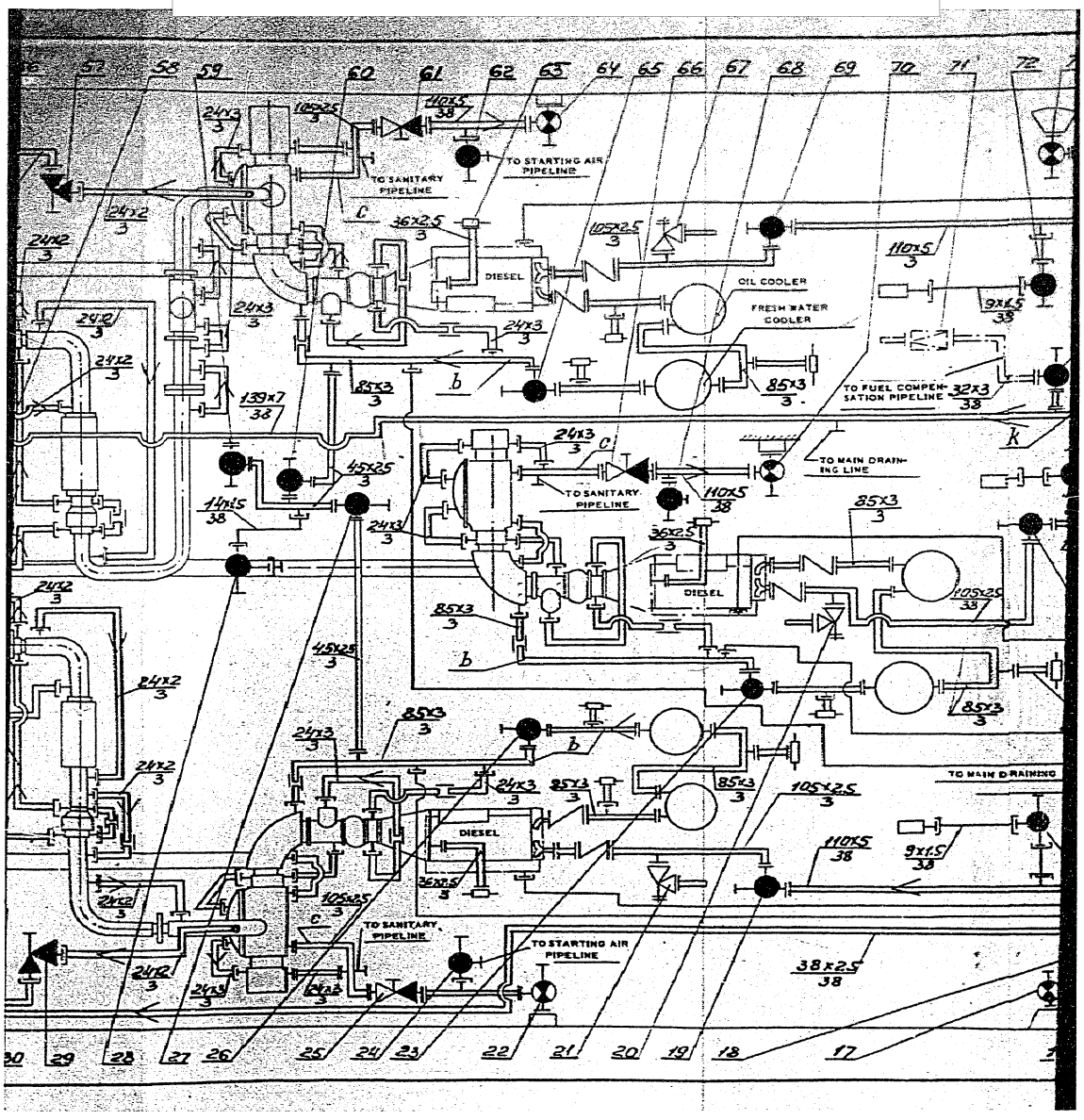

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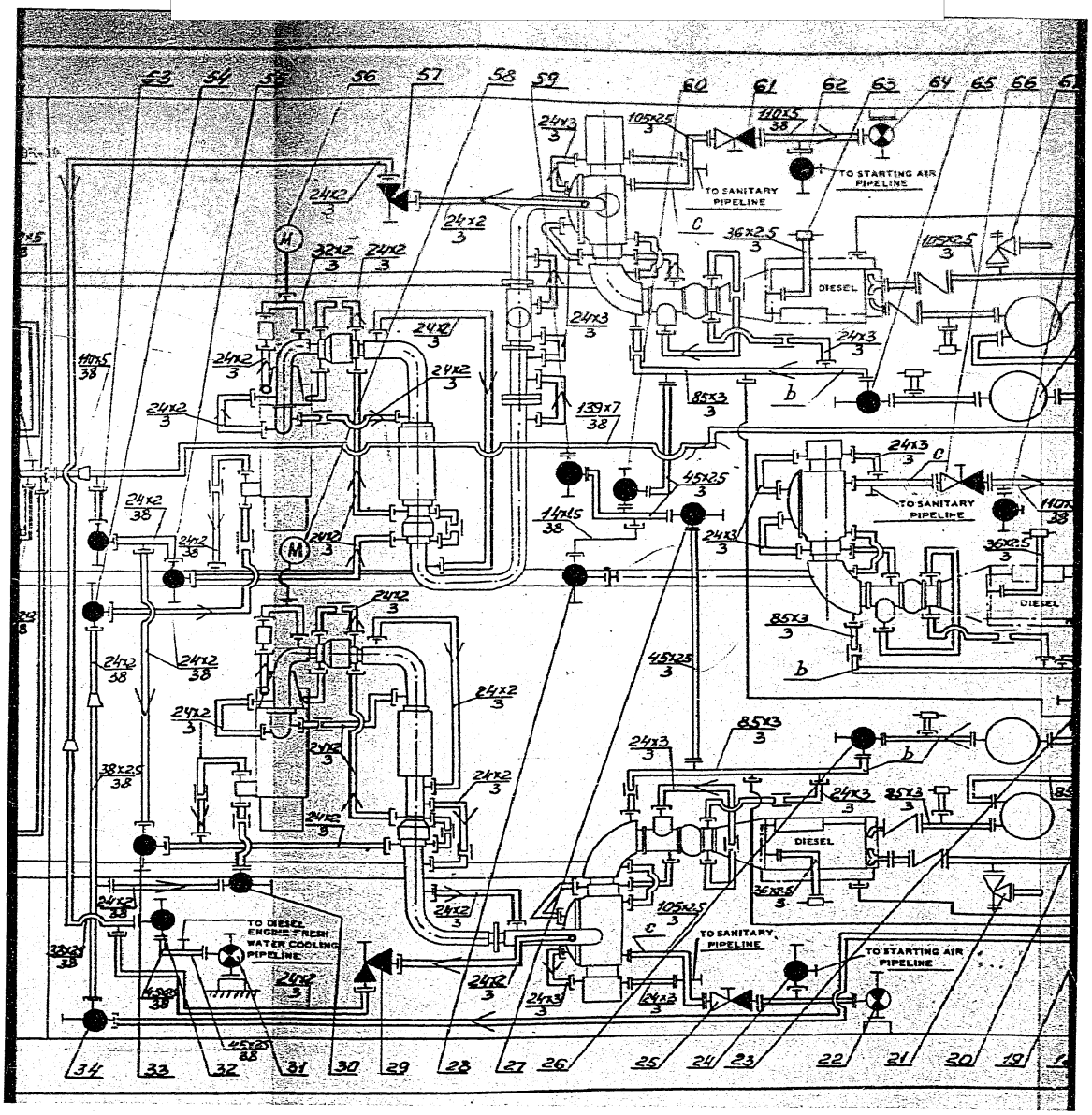

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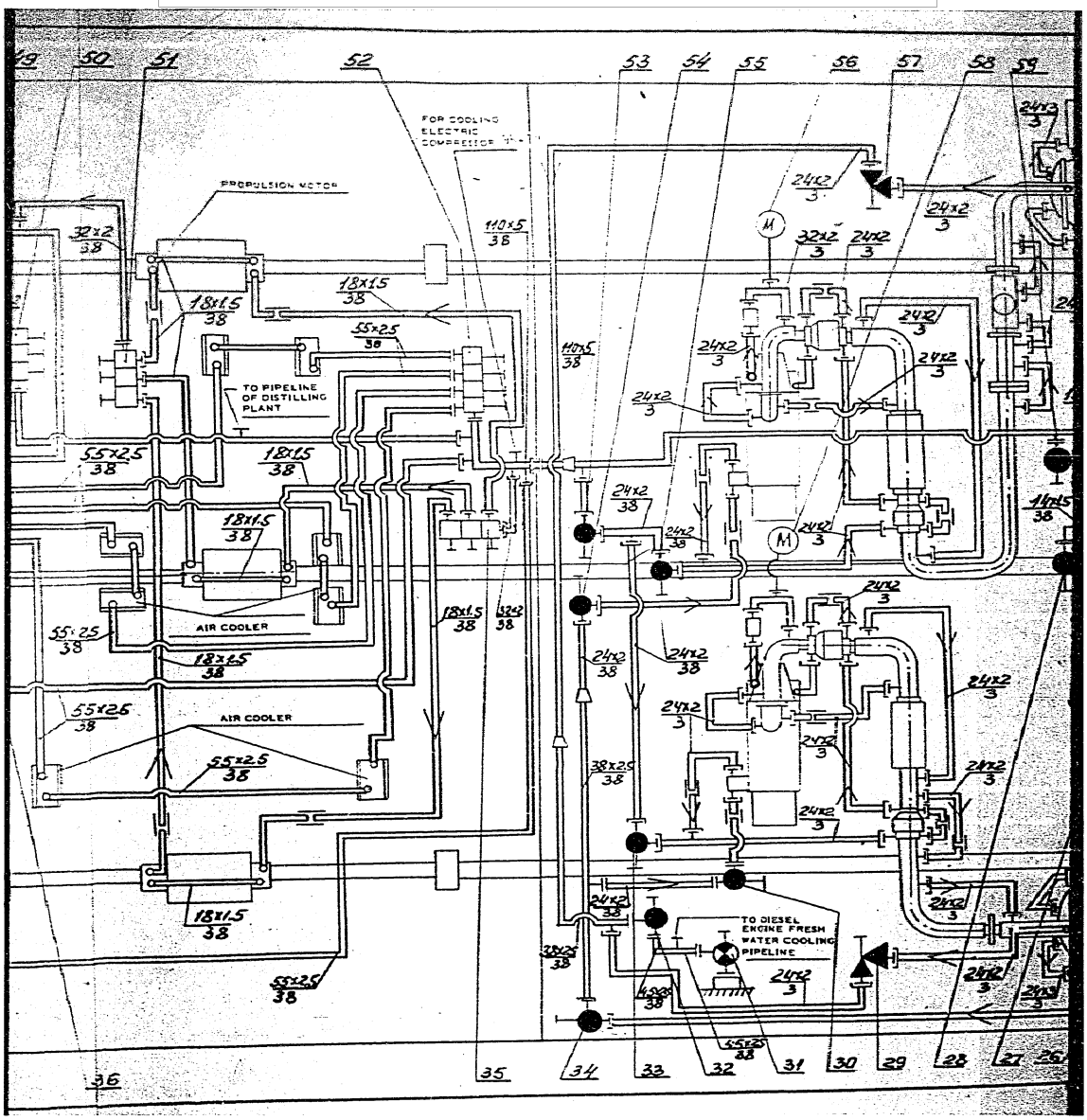

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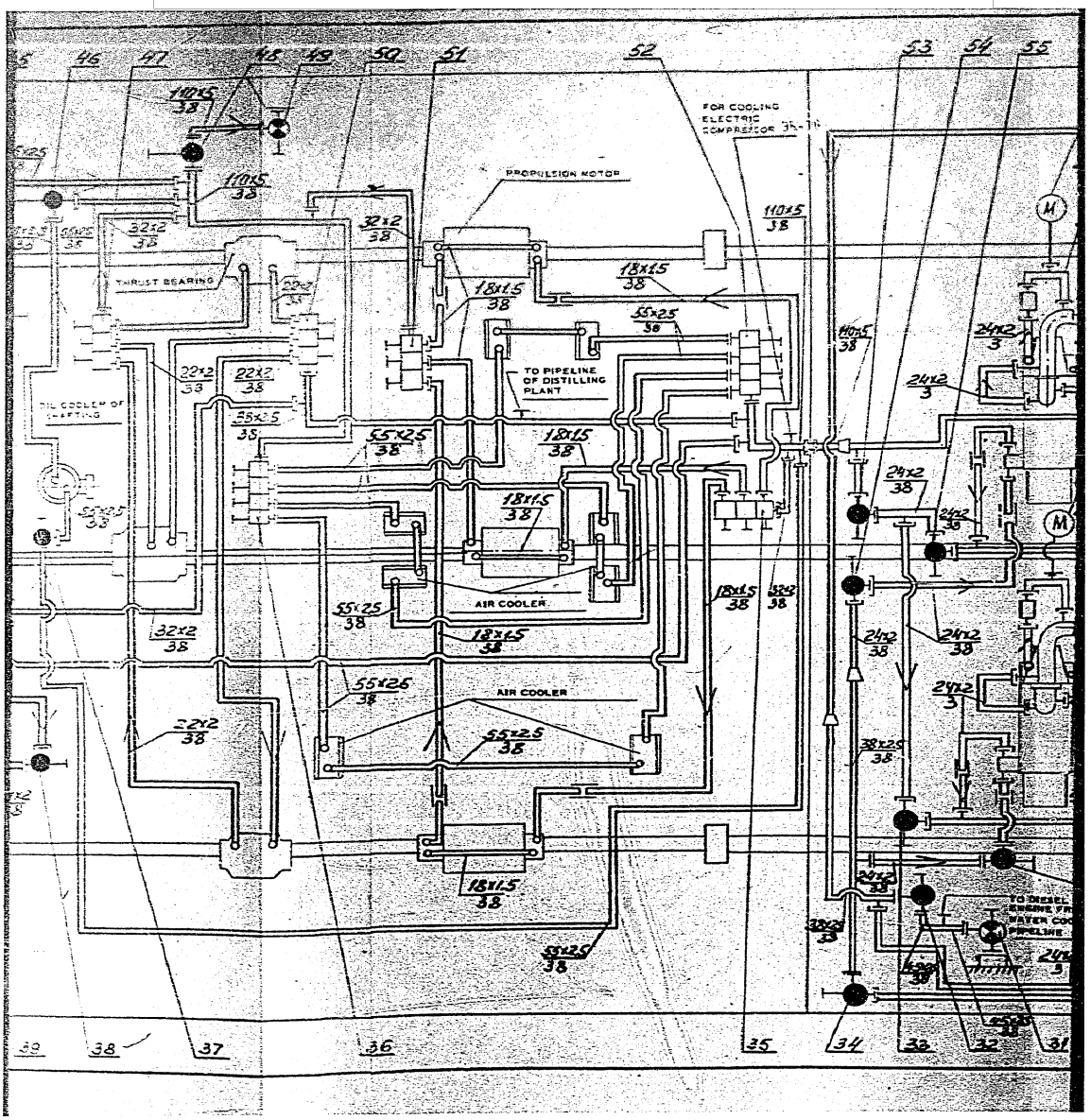

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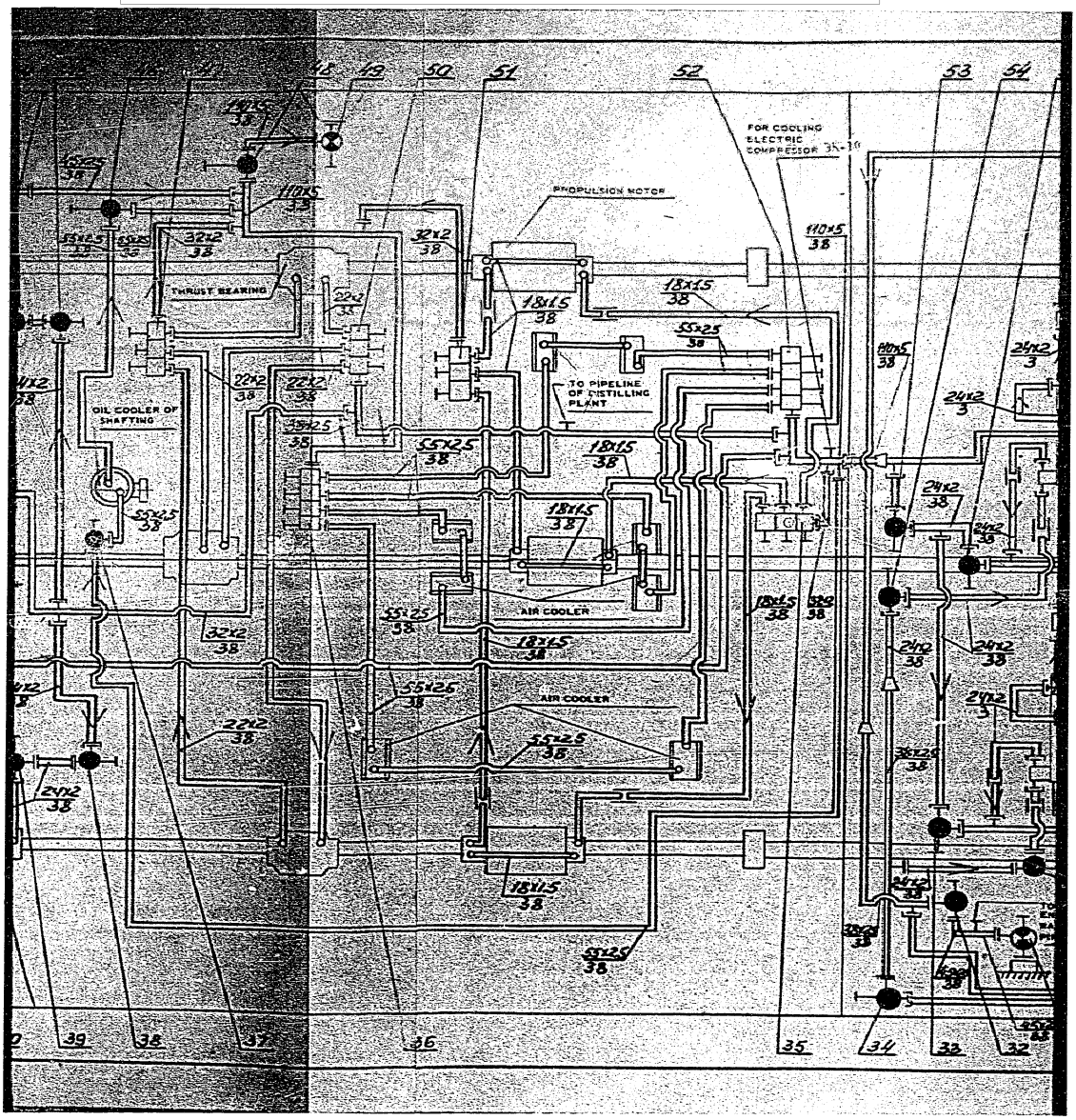

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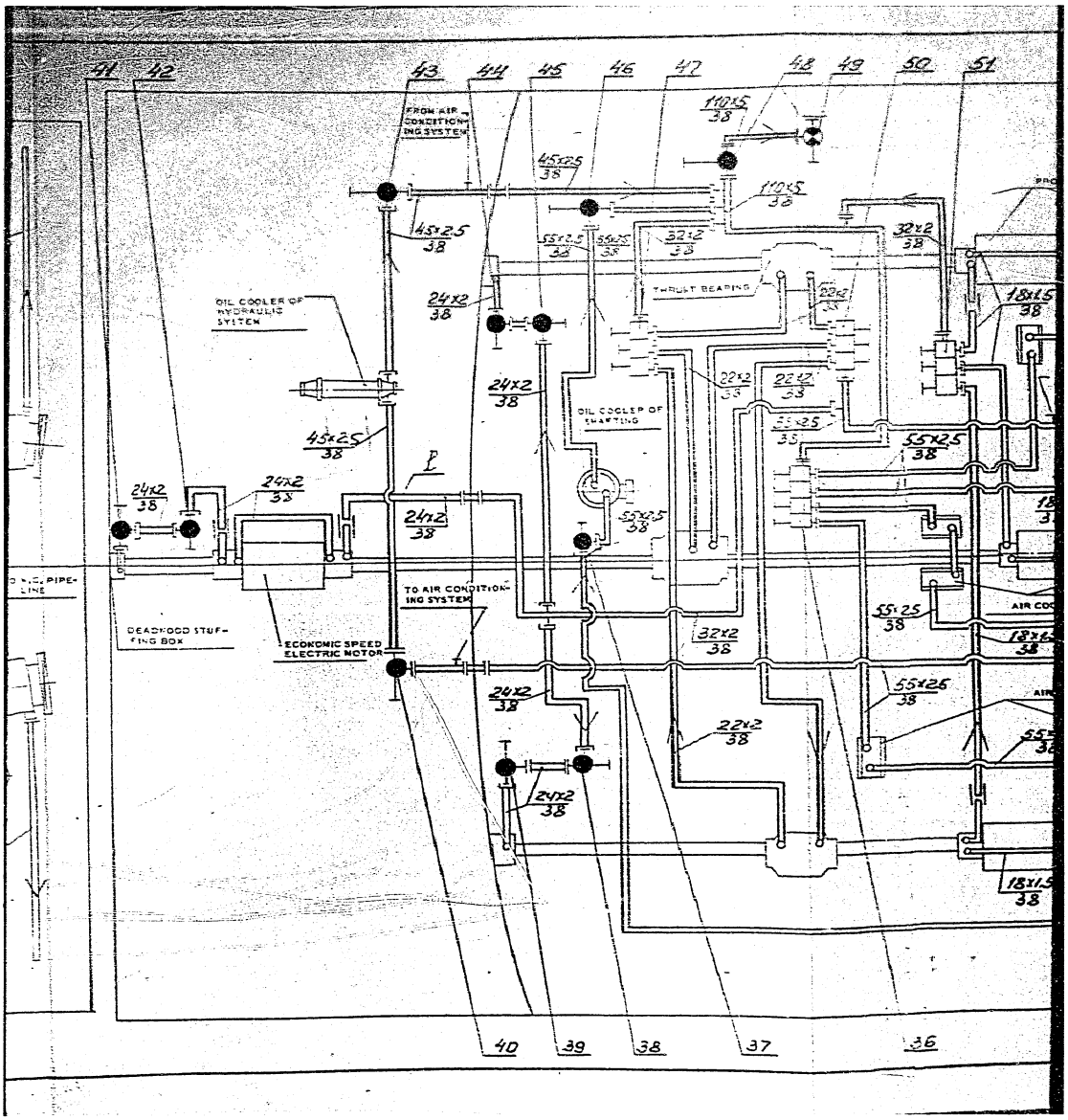

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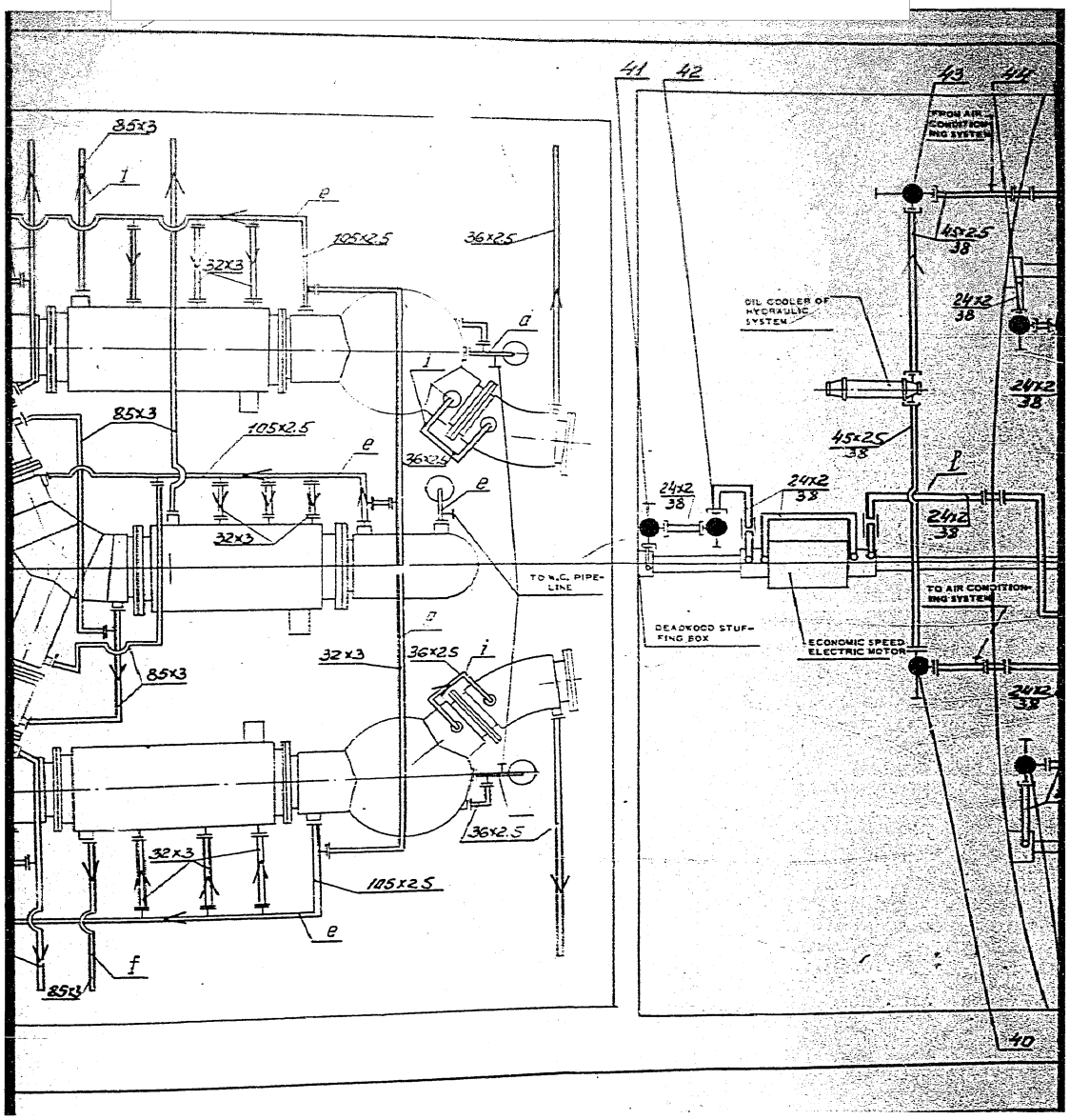

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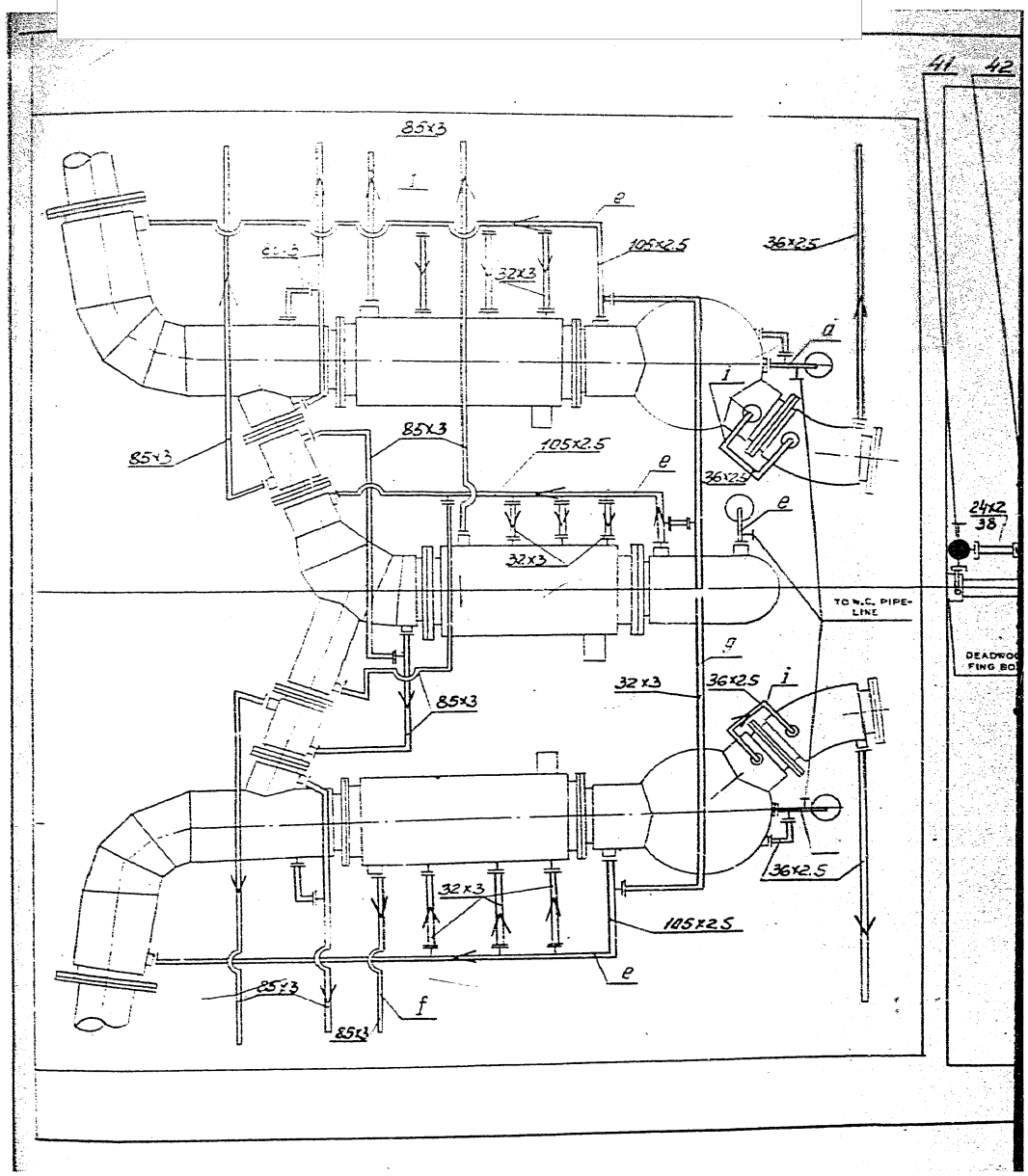

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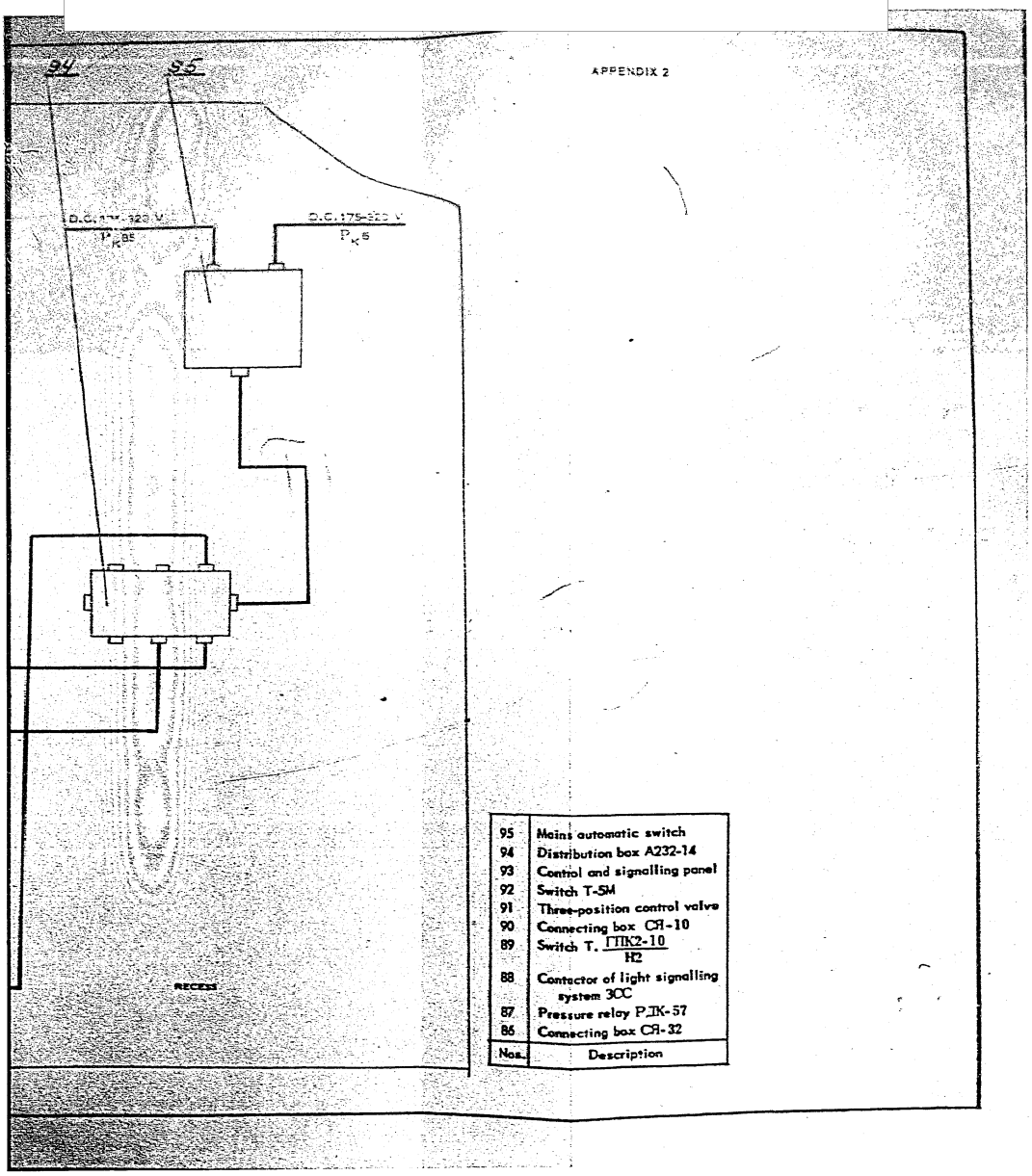
50X1-HUM

SECRET

50X1-HUM

APPENDIX 2



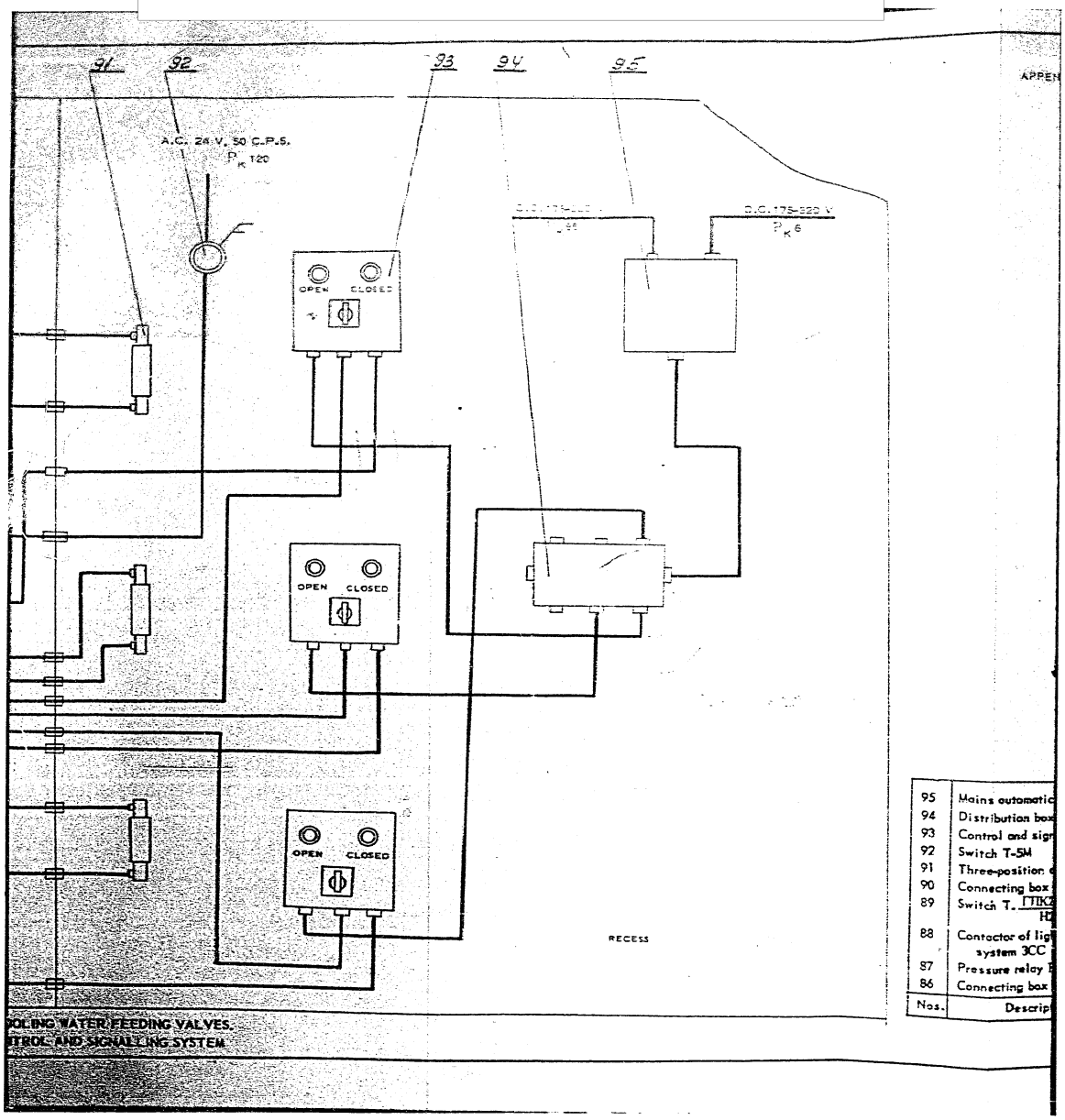
Nos.	Description
95	Mains automatic switch
94	Distribution box A232-14
93	Control and signalling panel
92	Switch T-5M
91	Three-position control valve
90	Connecting box CR-10
89	Switch T. ГПК2-10 / H2
88	Contactor of light signalling system 3CC
87	Pressure relay РДК-57
86	Connecting box CR-32

SECRET

50X1-HUM

SECRET

50X1-HUM



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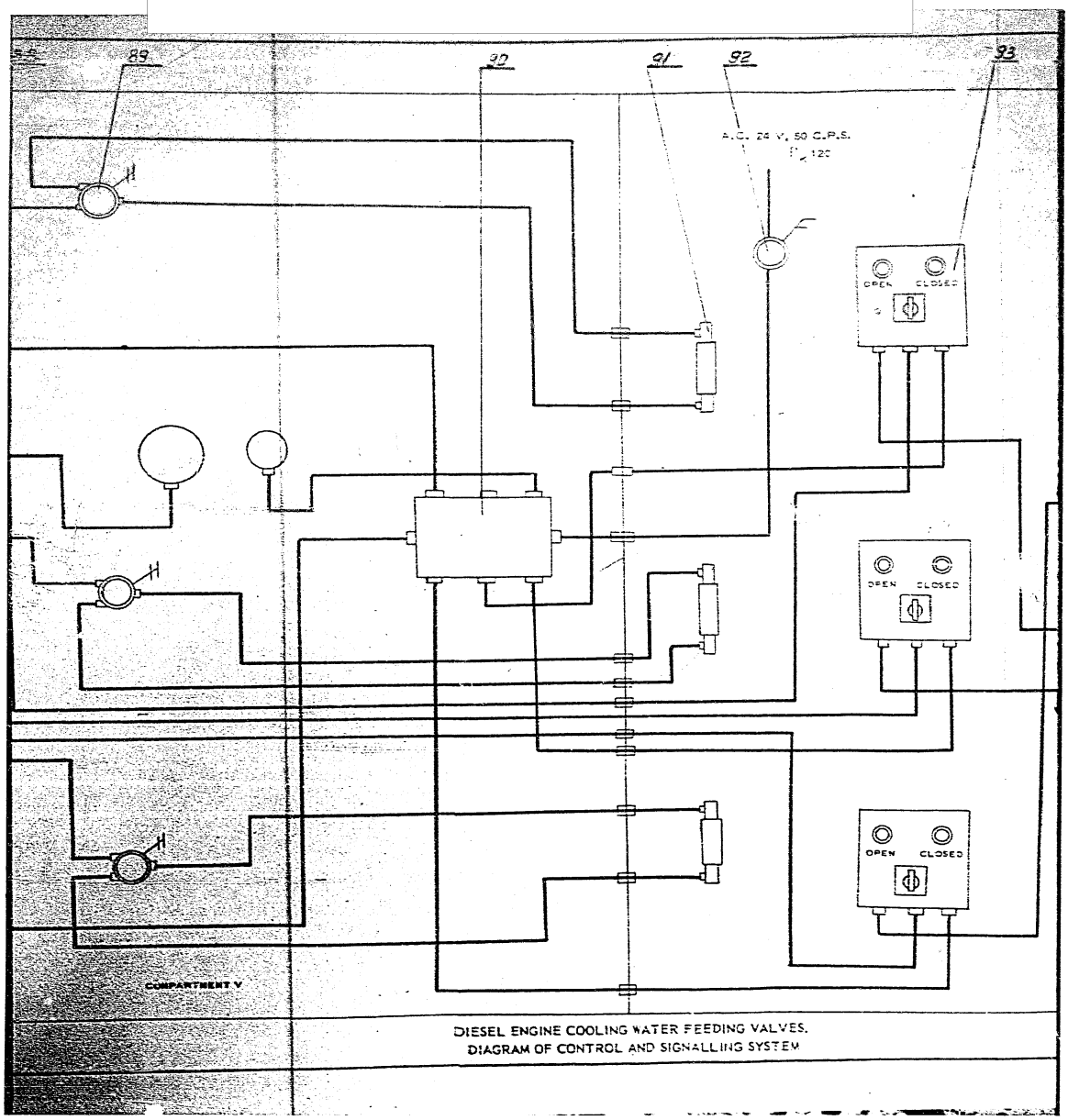
50X1-HUM

SECRET

50X1-HUM



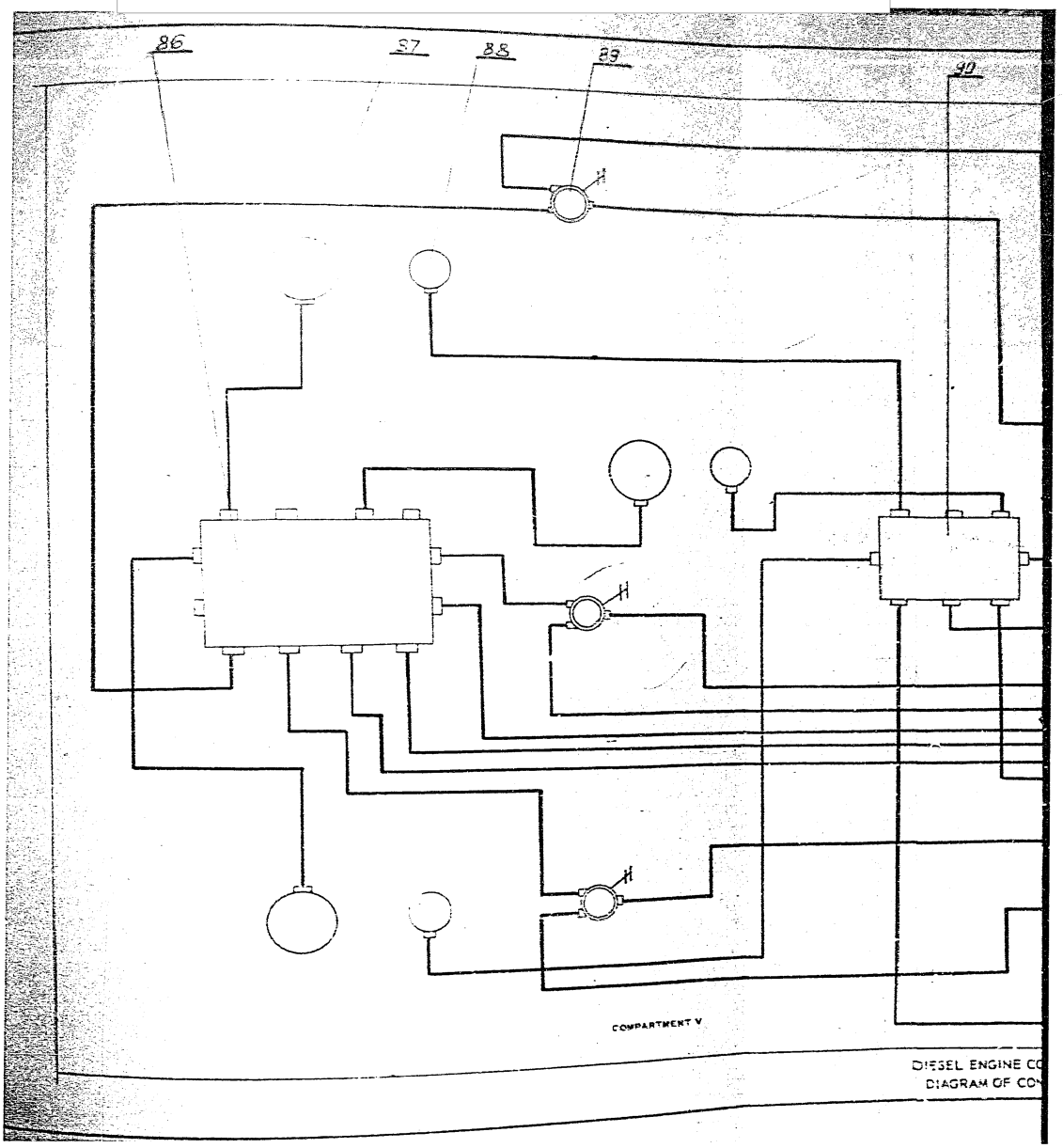
DIESEL ENGINE COOLING WATER FEEDING VALVES.
DIAGRAM OF CONTROL AND SIGNALLING SYSTEM

SECRET

50X1-HUM

SECRET

50X1-HUM

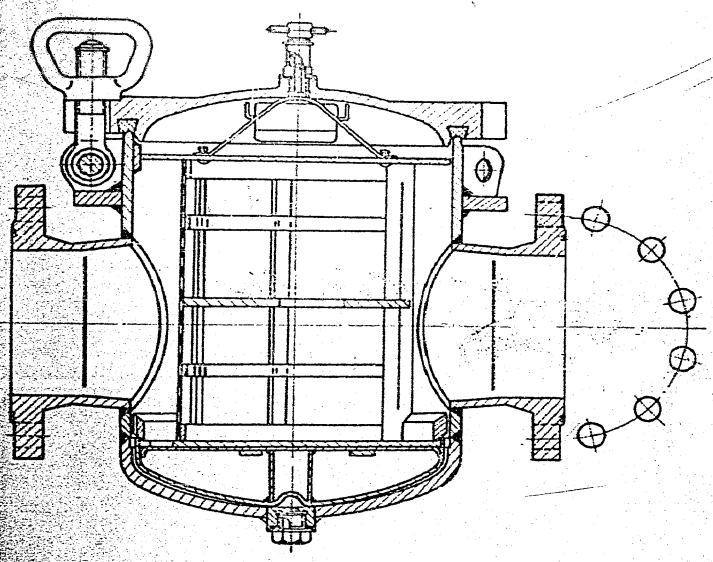


SECRET

50X1-HUM

50X1-HUM

APPENDIX 3



WATER FILTER

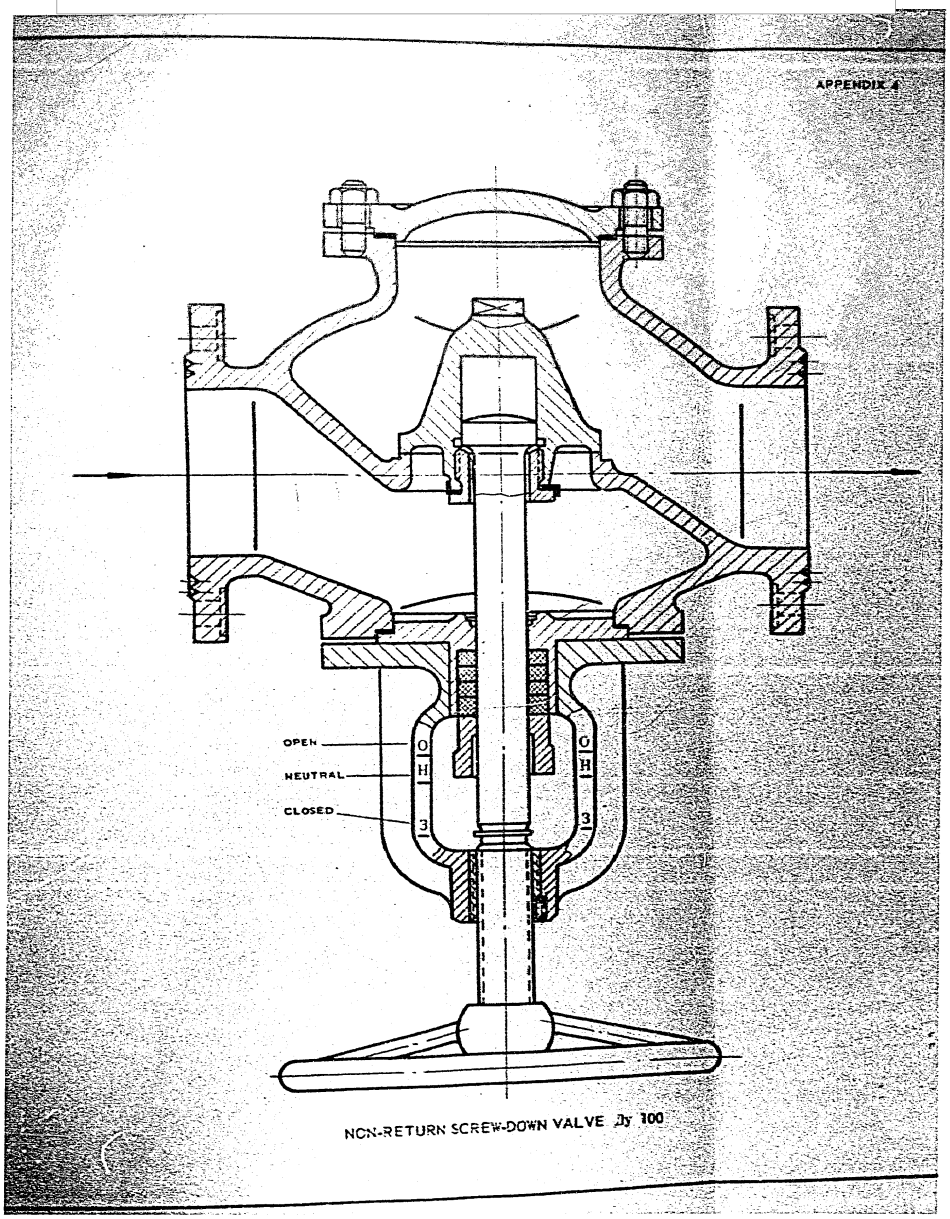
Ду 150; Ру=30 kgf/cm^2

50X1-HUM

SECRET

50X1-HUM

APPENDIX 4



NON-RETURN SCREW-DOWN VALVE Dy 100

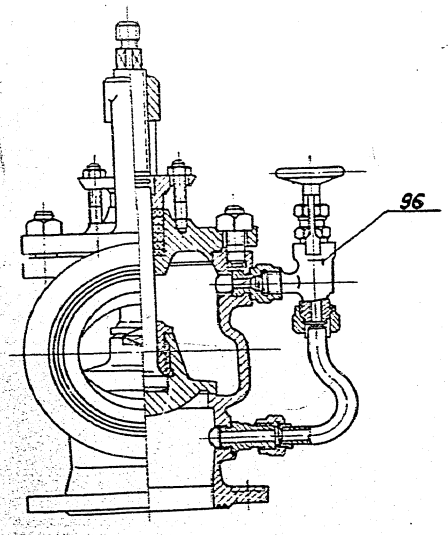
SECRET

50X1-HUM

SECRET

50X1-HUM

APPENDIX 5



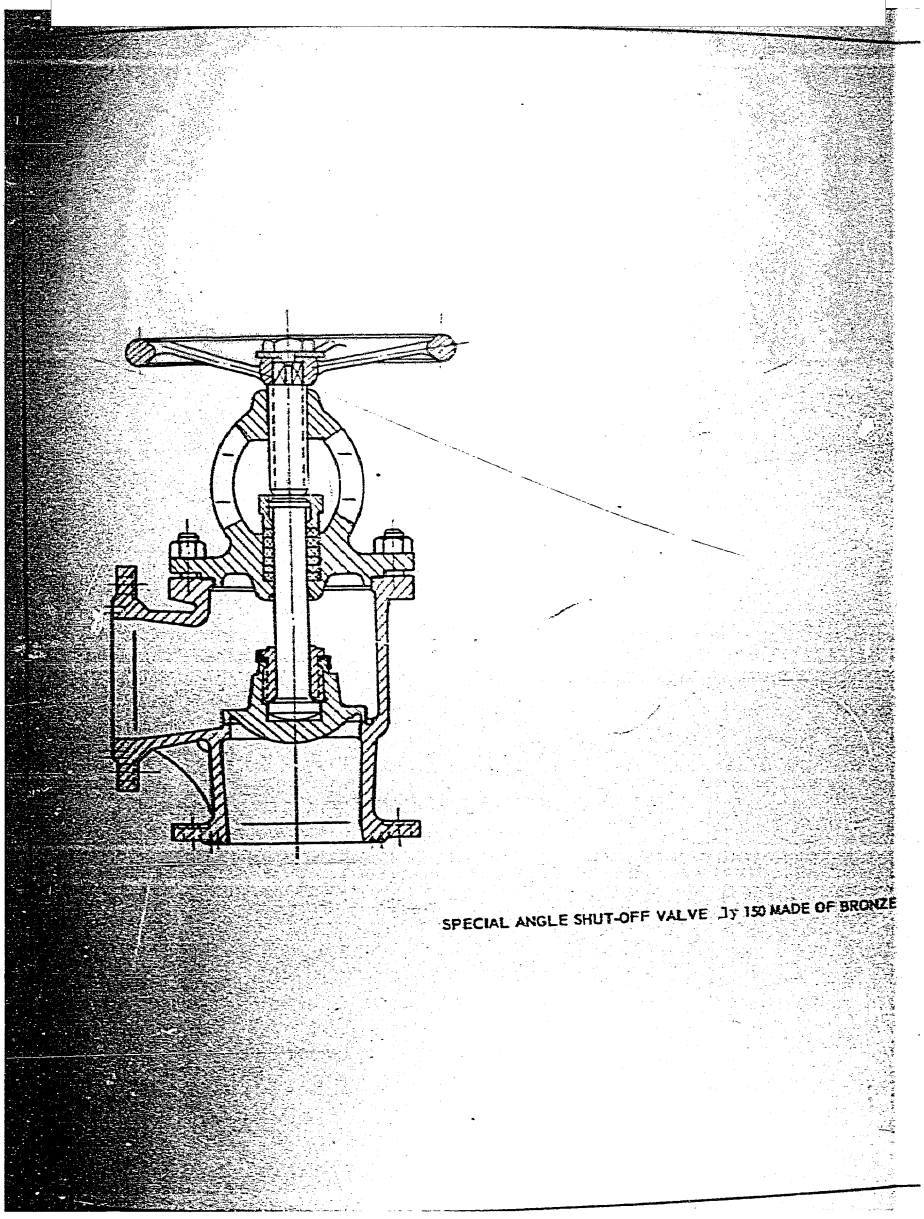
LE SHUT-OFF VALVE ...y 150 MADE OF BRONZE

SECRET

50X1-HUM

SECRET

50X1-HUM



SPECIAL ANGLE SHUT-OFF VALVE 1½ 150 MADE OF BRONZE

SECRET

50X1-HUM